

REMARKS

The Examiner has objected to the drawings for failing to designate Figure 1 as prior art. Applicant has amended the drawings to designate Figure 1 as prior art. Revised Figure 1 is enclosed with the changes marked in red for the Examiner's approval.

The Examiner has objected to Claim 7 under 37 CFR 1.75(c) as being in improper form because a multiple dependent claim cannot depend from any other multiple dependent claim. In response, Applicant has amended Claim 7 to depend only from Claim 2. Applicant has also added new Claims 18-21. Claims 18-21 set forth the limitations of Claim 7 but depend from Claims 3-6, respectively.

The Examiner has rejected Claims 5, 12 and 13 under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In response, Applicant has amended Claims 5, 12 and 13 to particularly point out and distinctly claim the invention.

The Examiner has rejected Claims 1, 8, 10, 11 and 14 under 35 U.S.C 102(a) as being anticipated by Applicant's Admitted Prior Art, Figure 1. The Examiner has rejected Claims 1, 8, 9-12 and 14 under 35 U.S.C 102(b) as being anticipated by German Patent No. 2,546,214. The Examiner has rejected Claims 1, 8-12 and 14 under 35 U.S.C 102(e) as being anticipated by Cotterill et al. The Examiner has rejected Claims 1-4, 6, 8-12 and 14 under 35 U.S.C 102(e) as being anticipated by Blacket et al. The Examiner has rejected Claims 1-4, 6, 8-12 and 14 under 35 U.S.C 102(e) as being anticipated by Speller, Sr. The Examiner has rejected Claims 1, 8, 10, 14 and 15 under 35 U.S.C 102(b) as being anticipated by Fuhrmeister.

In response, Applicant has canceled independent Claims 1 and 14 and introduced new independent Claims 17 and 22. Independent Claim 1 is rewritten as independent Claim 17 and independent Claim 14 is rewritten as independent Claim 22. Independent Claims 17 and 22 distinguish the sheet joining method and apparatus of the present invention over the above referenced prior art references. More specifically, independent Claims 17 and 22 have been written to refer specifically to setting the fastener such that its shank is upset into the cavity of a die without penetrating the lowermost sheet. Independent Claims 17 and 22 have also been written to include a sheet deforming assembly with an annular recess defined around the die cavity where the assembly deforms the sheets out of their planes into the annular recess.

✓ Applicant's admitted prior art illustrated in Figure 1 of the application fails to illustrate the annular recess defined around the cavity in the die as recited in independent Claims 17 and 22.

✓ German Patent No. 2,546,214 fails to illustrate an annular recess defined around the cavity in the die as recited in independent Claims 17 and 22.

Applicant submits that the 35 U.S.C. 102(e) rejections using the Cotterill et al. patent and the Blacket et al. patent are improper because Applicant is an inventor of the Cotterill et al. patent and the Blacket et al. Patent as indicated on the face of the patents. In addition, the Cotterill et al. patent and the Blacket et al. ~~patent~~ fail to illustrate a sheet deforming assembly with an annular recess defined around the cavity of the die. The Cotterill et al. patent and the Blacket et al. patent also fail to illustrate deforming the planar sheets out of the planes into the annular recess as recited in independent Claims 17 and 22 of the present application.

The Speller, Sr. patents fail to illustrate a method for joining planar sheets with a sheet deforming assembly having an annular recess defined around the cavity of a die where the fastener is upset in the die cavity without penetration of the lowermost sheet and the planar sheets are deformed out of the planes into the annular recess as recited in independent Claims 17 and 22. In contrast, the Speller, Sr. patents illustrate a dimpling and riveting apparatus and method where a dimple is formed in the work piece or sheet, a fastener passes through the dimple and the fastener penetrates through the lowermost portion of the work piece.

Finally, the Fuhrmeister patent also fails to illustrate a method for joining planar sheets with a sheet deforming assembly having an annular recess defined around the cavity of a die where the fastener is upset in the die cavity without penetration of the lowermost sheet and the planar sheets are deformed out of the planes into the annular recess as recited in independent Claims 17 and 22. In contrast, the Fuhrmeister patent illustrates a riveting apparatus and method where a fastener punches a hole in the sheet metal pieces thereby penetrating through the lowermost portion of the work piece.

As such, Applicants submit that independent Claims 17 and 22 are patentable over the prior art references. As a result, Applicants also submit that dependent Claims 2-13 and 18-21, which depend from Claim 17, are also patentable over the prior art references.

The Examiner has rejected Claims 13-15 under 35 U.S.C. 103(a) as being unpatentable over either Applicant's admitted prior art, German Patent No. 2,546,214, the Cotterill et al. patent, the Blacket et al. patent, the Speller, Sr. patents, or the Fuhrmeister patent as applied to the above Claims further in view of the Moore patent. Applicant submits that both original

independent Claim 14 and new independent Claim 22 fail to recite the limitation of a fastener head that increases in thickness so as to define a convex surface. As such, Applicant submits that the 35 U.S.C. 103 rejection with respect to Claim 14 is improper.

Applicant respectfully submits that Applicant's admitted prior art, German Patent No. 2,546,214, the Cotterill et al. patent, the Blacket et al. patent, the Speller, Sr. patents, the Fuhrmeister patent or the Moore patent, either alone or in combination, fail to disclose the key features of the present invention.

As described previously, Applicant's admitted prior art, German Patent No. 2,546,214, the Cotterill et al. patent, the Blacket et al. patent, the Speller, Sr. patents, and the Fuhrmeister patent fail to illustrate a sheet deforming assembly with an annular recess defined around the die cavity where the assembly deforms the sheets out of their planes into the annular recess. The prior art references also fail to disclose setting a fastener such that its shank is upset into the cavity of a die without penetrating the lowermost sheet.

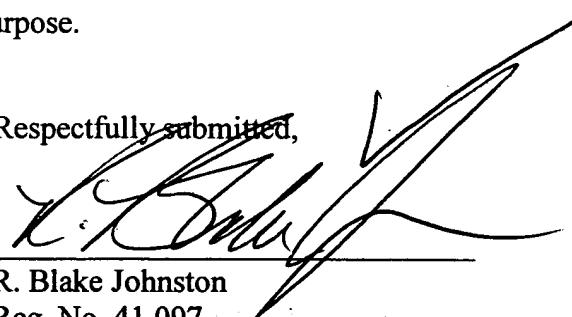
The Moore patent also fails to disclose the sheet deforming assembly with an annular recess defined around the die cavity where the assembly deforms the sheets out of their planes into the annular recess and setting the fastener such that its shank is upset into the cavity of a die without penetration of the lowermost sheet as set forth in independent Claim 17. In contrast, the rivet disclosed in the Moore patent pierces through the metal sheets.

Accordingly, Applicants submit that dependent Claims 13 and 15 are patentable over Applicant's admitted prior art, German Patent No. 2,546,214, the Cotterill et al. patent, the

Bracket et al. patent, the Speller, Sr. patents, and the Fuhrmeister patent in view of the Moore patent.

In view of the foregoing amendments and remarks, it is believed that the application is now in condition for allowance and such action is respectfully requested. If the Examiner believes that a telephone conference would advance the prosecution of this case, it is requested that the undersigned attorney be contacted for that purpose.

Respectfully submitted,


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8/5/02

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Version with markings to show changes made to the Claims

17. (New) A method for joining together two or more superimposed generally planar sheets using a fastener having a shank and a fastener setting and sheet deforming assembly comprising a die with a cavity and an annular recess defined around said cavity, comprising the steps of:

placing the superimposed planar sheets in the fastener setting and sheet deforming assembly; and

operating the assembly to set the fastener into engagement with the sheets such that the shank of the fastener is upset in said die cavity without penetration of the lowermost sheet, and to deform all the sheets out of their planes into the annular recess.

18. (New) A method according to claim 3 wherein the sheets are deformed by a head portion of the fastener.

19. (New) A method according to claim 4 wherein the sheets are deformed by a head portion of the fastener.

20. (New) A method according to claim 5 wherein the sheets are deformed by a head portion of the fastener.

21. (New) A method according to claim 6 wherein the sheets are deformed by a head portion of the fastener.

22. (New) An apparatus for joining together two or more superimposed generally planar sheets with a fastener having a shank, the apparatus comprising a fastener setting and sheet deforming assembly comprising a die, a cavity in said die and an annular recess defined around said cavity, the apparatus being operative to receive the sheets, to set said fasteners into engagement with the sheets such that the shank of the fastener is upset in said die cavity without penetration of at least the lowermost sheet and to deform all the sheets out of their plane into the annular recess.

2. (Amended) A method according to claim [1] 17, wherein the sheets are deformed before the fastener is set.

5. (Amended) A method according to claim [3] 2, wherein the sheets are unclamped before the fastener is set.

6. (Amended) A method according to claim 3, 4 or 5 wherein the sheets are clamped together between a clamping member and [a] the die, [shaped such that] the sheets [are] being deformed between the clamping member and the die.

7. (Amended) A method according to claim 2 [, 3, 4, 5, or 6] wherein the sheets [are] supported around the predetermined location by a support surface defining a recess into which the sheets] are deformed by a head portion of the fastener.

8. (Amended) A method according to claim [1] 17, wherein the sheets are deformed after the fastener is set.

9. (Amended) A method according to claim 8, wherein the sheets to be deformed are clamped between a clamping member and [a] the die, [shaped such that] the sheets [are] being deformed between the clamping member and the die.

10. (Amended) A method according to claim [1] 17, wherein the sheets are deformed and the fastener is set simultaneously.

11. (Amended) A method according to claim 10, wherein the sheets are deformed by [supporting the sheets on a die defining a recess extending around the predetermined location,] a head portion of the fastener driving the sheets into the recess when the fastener is set.

12. (Amended) A method according to claim 11, wherein the sheets are clamped against [the] a surface of the die outside the [said] recess during the setting of the fastener.

13. (Amended) A method according to claim 11 or 12, wherein the fastener head has a periphery, the fastener head increases in thickness toward [its] the periphery so as to define a convex surface facing the recess formed in the die.

15. (Amended) A rivet for use in accordance with the method of claim [1] 17, comprising a head the thickness of which increases continually in the radially outwards direction to define a convex surface beneath the head.



WO 99/15288

PCT/GB98/02829

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